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In the United States Patent & Trademark Office

In re Patent of

April 12, 2004

Joe B. Kennedy et al. Patent No: 5,884,682 Issued: March 23, 1999

For: Position-Based Integrated Motion Controlled Curve Sawing

04/14/2004 EFLORES 00000053 5884682

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180.00 GP

SUBMISSION OF PRIOR ART UNDER 37 CFR 1.501

Hon. Commissioner for Patents U.S. Patent and Trademark Office 2011 South Clark Place Customer Window, Mail Stop Ex Parte Reexam Crystal Plaza Two, Lobby, Room 1B03 Arlington, VA 22202 **USA**

Hon. Commissioner:

The undersigned herewith submits in the above identified patent the following prior art, including copies thereof, which is pertinent and applicable to the Kennedy et al. patent and is believed to have a bearing on the patentability of claims 1-72 thereof:

Prior Publications:

The Kubik Publication, 1971

"The Application of Piecewise Polynomials to Problems of Curve and Surface Approximation", Nr. 12, by Dr. Kurt Kubik, Published by Rijkswaterstaat Communications, Directie Waterhuishouding En Waterbeweging, The Hague, Netherlands, 1971. This document was obtained from the Engineering Library of the University of New Brunswick, Canada.

The introduction (page 5) teaches that a curve made using a polynomial can be adjusted according to imposed conditions such a desired slope of the curve or the curvature of the curve. From pages 7-22, the document proposes some methods for the interpolation of smooth curves, using constraints such as the angular inclination of the curve and/or the curvature and/or the change of curvature. On page 18, the document also suggests the smoothing and adjustment of curves using a computer. Line 17, page 18 teaches that the designer may impose curve constraints when computing the curve.

The Lancaster Publication, 1986

"Curve and Surface Fitting, An Introduction", by Peter Lancaster and Kestutis Salkauskas. Published by Academic Press, Toronto, 1986. This document was obtained from the Engineering Library of the University of New Brunswick, Canada.

This document discloses at page 21, first paragraph; "In any study of curve/or surface fitting there is one class of functions that plays a supremely important role. This is the class of polynomial functions." The polynomial function is illustrated as equation (1.6) on that page. This equation is essentially the same as the one in US 5,884,682.

Chapter 2 teaches polynomial interpolation to obtain smooth curves with different shapes. Chapter 3 teaches Interpolation with Piecewise Polynomial Functions. The teaching in this chapter is clear that one can select different slopes in the interpolation (page 81). Chapter 4 also teaches a method to adjust the smoothness and slope parameters (page 89).

It is believed that this document has bearing on the patentability of claims 2, 12 and 21 of the Kennedy et al. patent.

The Zeid Publication, 1991

"CAD/CAM Theory and Practice", by Ibrahim Zeid, published by McGraw-Hill, 1991. This document was obtained from the Engineering Library of the University of New Brunswick, Canada.

This manual teaches in Chapter 5, two methods to control the shape of curves; the Bezier Curve Technique and the B-Spline Curve technique.

- -On page 212, it is taught that synthetic curves represent a curve-fitting problem to construct a smooth curve that passes through given data points. Therefore, polynomials are the typical form of these curves.
- On page 717-718, it is taught that a user can write a program to generate a curve automatically from geometric data.
- On pages 740-741, an example is provided on how to create a curve with limitations of curvatures.

- On pages 1011-1024, it is taught that the tool path is modified according to the constraints of the machine, the cutting tool in this case.

It is believed that this document has bearing on the patentability of claims 1-43 and 52-72 of the Kennedy et al. patent.

The Gerald Publication, 1994.

"Applied Numerical Analysis", fifth Edition, by Curtis F. Gerald and Patrick O., Wheatley, published by Addison-Wesley Publishing Company, Don Mills, Ontario, 1994. This document was obtained from the Engineering Library of the University of New Brunswick, Canada.

Chapter 3 teaches the interpolation of polynomials, curve fitting and curve adjustment. This manual was used in 1997 by third year Engineering Students at the University of New Brunswick, in a course entitled "Introduction to Numerical Methods" (CE 3933).

The Hards Publication, 1989

"Curve Sawing", by John Hards; an article presented in the Canada/BC Forest Resource Development Agreement, Report 102 entitled: Advances in Sawmill Technology, dated October 1989. This document was obtained from the Science Library of the University of New Brunswick, Canada.

This document discloses from the bottom of page 122, that the arc of the curve in curve sawing should fit into the clearance between the teeth and the saw blade as illustrated in Figure 2.

It is believed that this document has bearing on the patentability of claims 1-43 and 52-72 of the Kennedy et al. patent.

GB 2,068,294 published on Aug. 12, 1980 and issued to P. Strandberg on Feb. 5, 1980. This document discloses an apparatus to guide a workpiece between a pair of chipping heads. The document discloses the use of photocells, encoders and polynomials to generate optimized curves.

It is believed that this document has bearing on the patentability of claims 1-30, 32, 34, 36, 38, 40 and 52-72 of the Kennedy et al. patent.

US 3,736,968 issued to H.C. Mason on June 5, 1973.

This document discloses the use of chipping heads to remove flares and bulges on a workpiece prior to sawing.

It is believed that this document has bearing on the patentability of claim 29 of the Kennedy et al. patent.

US 3,886,372 issued to B. **Sanglert** on May 27, 1975.

This document discloses a scanner and a positioning table to position a wood board relative to a pair of saws that are also adjustable relative to the board.

It is believed that this document has bearing on the patentability of claims 1-47 and 52-72 of the Kennedy et al. patent.

US 3,890,509 issued to C.W. Maxey on June 17, 1975.

This document also discloses a scanner and a positioning table and a pair of chipper heads. The positioning table and the chipper heads are adjustable relative to each other.

US 4,086,496 issued to L.B. Berry on April 25, 1978.

This document also discloses a scanner and a positioning table and a pair of saws. The positioning table and the saws are adjustable relative to each other.

US 4,188,544 issued to L.H. Chasson on Feb. 12, 1980

This document discloses a pair of guided saws on a common arbor (Fig. 8) to follow an optimized tool path on a scanned board.

US 4,228,351 issued to S.G. Snow et al. on October 14, 1980.

This document discloses an X-ray machine and method for measuring the density of various materials.

It is believed that this document has bearing on the patentability of claims 5, 8, 16, 19, 28, 40, 43 and 66 of the Kennedy et al. patent.

US 4,263,949 issued to E.M. Kivimaa on April 28, 1981.

This document discloses a chipping head and the importance of feed speed and the rpm of a chipping head to control chip quality.

It is believed that this document has bearing on the patentability of claims 8, 19, 28, and 43 of the Kennedy et al. patent.

US 4,475,422 issued to K.T. Lawson on October 9, 1984.

This document discloses a computer-controlled machine having a pair of cutting tools mounted of a base that is movable sideways and angularly for following a curve

Page

It is believed that this document has bearing on the patentability of claims 10-20, 26, 45, 53 and 57 of the Kennedy et al. patent.

US 4,485,861 issued to P. Nilsson et al. on December 4, 1984.

This document discloses a machine having a pair of chipping heads upstream of a pair of bandsaws. The chipping heads and the band saws are mounted on adjustable bases. The document also discloses the use of photo cells to detect the movement of a workpiece and anvils to guide the workpiece.

It is believed that this document has bearing on the patentability of claims 7, 13, 18, 25, 27, 42, 47, 48-51, 55, 57, 59, and 68 of the Kennedy et al. patent.

US 4,702,134 issued to A.J. Corley, III on October 27, 1987.

This document discloses a positioning table to orient a workpiece prior to sawing.

US 4,926,917 issued to E. Kirbach on May 22, 1990.

This document discloses a system and method to control the feed speed of a log into a saw according to the depth of cut through the log.

It is believed that this document has bearing on the patentability of claims 4, 8, 15, 19, 28, 39, 43 and 65 of the Kennedy et al. patent.

US 4,963,805 issued to Suzuki et al. on October 16, 1990

This document discloses a machine tool using smoothing curves and a recalculation of the tool path according to machine constraints.

US 4,989,155 issued to J.D. Begin et al. on January 29, 1991.

This document discloses a power monitor to monitor the load on a motor and to control a machine tool's operation using a computer.

It is believed that this document has bearing on the patentability of claims 3, 8, 14, 19, 28, 40, 43, 64 and 66 of the Kennedy et al. patent.

US 5,143,127 issued to K. Rautio on September 1, 1992.

This document discloses driven feed rolls upstream of a pair of chipping heads.

It is believed that this document has bearing on the patentability of claims 36, 37, 51, 60 and 63 of the Kennedy et al. patent.

US 5,213,020 issued to Pleau et al. on May 25, 1993.

This document discloses a circular saw and teaches that different feed speeds should be used for different wood species.

It is believed that this document has bearing on the patentability of claims 4, 5, 8, 15, 16, 19, 28, 29, 40, 43, 65 and 66 of the Kennedy et al. patent.

US 5,396,938 issued to R.L. Cannaday on Mar. 15, 1995.

This document discloses a machine having chipping heads opposite a guiding surface relative to a feed path, and guiding rolls aligned with the chipping heads. The chipping heads, the guide rolls and the guiding surface are upstream relative to a gangsaw.

It is believed that this document has bearing on the patentability of claims 20-25, 28, 29, 44-47, and 56-59 of the Kennedy et al. patent

US 5,417,263 issued to R.B. Jorgensen on May 23, 1995.

This document discloses a chipper disc and teaches that chip quality is related to rpm of the chipping disc and the feed speed of the log into the chipping disc.

It is believed that this document has bearing on the patentability of claims 8, 19, 28 and 43 of the Kennedy et al. patent.

US 5,418,731 issued to T. Yoshimura et al. on May 23, 1995.

This document discloses a machining center using smoothing and interpolating curves until the curve meets a predetermined criterion (col. 2, lines 40-45). The numerical control unit is applicable to NC machining centers. (col. 6, lines 63-64).

Not all the documents cited above have been associated with one or more specific claims of the Kennedy et al. patent. These additional documents are nonetheless submitted herewith to determine a level of ordinary skill in the art of certain aspects of the Kennedy et al. method and apparatus. In that regard,

the Kubik and Gerald publications as well as the Suzuki et al., and the Yoshimura et al. patents are submitted herewith to show that the application of polynomials, curve fitting, curve smoothing, tool path generation, tool path recalculation, and programming with machine constraints are all subjects that are well known to engineering students and to all those working with computer-controlled machines.

Similarly, the Maxey, Berry and Corley III patents are submitted herewith to show that the use and structure of a positioning table capable of skewing and prepositioning a workpiece prior to sawing is well known in the art of woodworking machines.

Further, the **Chasson**, patent is submitted to show that the guiding of a plurality of saws mounted on a same arbor to follow a computed tool path is also well known in the art.

The prior art listed above was not of record in the file of the Kennedy et al. patent These prior art references disclose various features claimed in the Kennedy et al. patent. It is believed that should these references had been of record at the time the Kennedy et al. application was examined, all the claims of the Kennedy et al. application would have been rejected for being obvious to the person of ordinary skills in the art.

Therefore the prior art listed above is considered relevant prior art printed publication applicable to the Kennedy et al. patent.

Sheriaul

Respectfully submitted,

MarioTheriault, P.Eng.

Reg. no. 40,368 Patent Agent

Certificate of Service

I hereby certify on this 12th day of April 2004, that a true and correct copy of the foregoing "Submission of Prior Art" was mailed by Federal Express courier, postage paid, to:

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Mario Theriault, P.Eng.

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Patent Agent Reg. 40,368

PTO/SB/08A (08-03)

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Sheet

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

two

| Complete if Known | | | |
|------------------------|----------------|--|--|
| Patent | 5,884,682 | | |
| Filing Date | Mar. 21, 1997 | | |
| First Named Inventor | Joe B. Kennedy | | |
| Art Unit | 3725 | | |
| Examiner Name | W. Donald Bray | | |
| Attorney Docket Number | 24096 | | |

| Examiner | Cite | D | | DOCUMENTS | |
|-----------|------|--|-----------------------------|--|--|
| Initials* | No.1 | Document Number Number-Kind Code ^{2 (# known)} | Publication Date MM-DD-YYYY | Name of Patentee or Applicant of Cited Document | Pages, Columns, Lines, Where Relevant Passages or Relevan Figures Appear |
| | | ^{US-} 3,736,968 | 06-05-1973 | H.C. Mason | entire document |
| | | ^{US-} 3,886,372 | 05-27-1975 | B. Sanglert | entire document |
| | | ^{US-} 3,890,509 | 06-17-1975 | W. C. Maxey | entire document |
| | | ^{US-} 4,086,496 | 04-25-1978 | L.B. Berry | entire document |
| <u> </u> | | ^{US-} 4,188,544 | 02-12-1980 | L.H. Chasson | entire document |
| | | ^{US-} 4,228,351 | 10-14-1980 | S.G. Snow et al. | entire document |
| | | ^{US-} 4,263,949 | 04-28-1981 | E.M. Kivimaa | entire document |
| | | ^{US-} 4,475,422 | 10-09-1984 | K.T. Lawson | entire document |
| | | ^{US-} 4,485,861 | 12-04-1984 | P. Nilsson et al. | entire document |
| | | ^{US-} 4,702,134 | 10-27-1987 | A.J. Corley, III | entire document |
| | | ^{US-} 4,926,917 | 05-22-1990 | E. Kirbach | entire document |
| | | ^{US-} 4,963,805 | 10-16-1990 | Suzuki et al. | entire document |
| _ | | ^{US-} 4,989,155 | 01-29-1991 | J.D. Begin et al. | entire document |
| | | ^{US-} 5,143,127 | 09-01-1992 | K. Rautio | entire document |
| | | US- 5,213,020 | 05-25-1993 | Pleau et al. | entire document |
| | | ^{US-} 5,396,938 | 05-15-1995 | R.L. Cannaday | entire document |
| | | ^{US-} 5,417,263 | 05-23-1995 | R.B. Jorgensen | entire document |
| | | ^{US-} 5,418,731 | 05-23-1995 | T. Yoshimura et al. | entire document |
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| Examiner Cite Initials* No.1 | Foreign Patent Document | oreign Patent Document Publication Name of Patentee or | | Pages, Columns, Lines, Where Relevant Passages | | |
| | | Country Code ³ Number ⁴ Kind Code ⁵ (if known) | MM-DD-YYYY | | Or Relevant Figures Appear | T⁵ |
| | | GB 2,068,294 | 02-05-1980 | P. Strandberg | entire document | V |
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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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| | | | | Patent | 5,884,682 | |
| | | | CLOSURE | Filing Date | Mar. 21, 1997 | |
| STATEMENT BY APPLICANT | | | PPLICANT | First Named Inventor | Joe B. Kennedy | |
| (Use as many sheets as necessary) | | | | Art Unit | 3725 | |
| (Ose as many sneets as necessary) | | | | Examiner Name | W. Donald Bray | |
| Sheet | two | of | two | Attorney Docket Number | 24096 | |

| | | NON PATENT LITERATURE DOCUMENTS | |
|-----------------------|--------------------------|--|----------------|
| Examiner Initials* | Cite No. ¹ | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published. | T ² |
| <u> </u> | | "The Application of Piecewise Polynomials to Problems of Curve and Surface Approximation", Nr. 12, by Dr. Kurt Kubik, Published by Rijkswaterstaat Communications, Directie Waterhuishouding En Waterbeweging, The Hague, Netherlands, 1971. (A portion thereof) | |
| 9 | | "Curve and Surface Fitting, An Introduction", by Peter Lancaster and Kestutis Salkauskas. Published by Academic Press, Toronto, 1986. (A portion thereof) | |
| 3 | | "CAD/CAM Theory and Practice", by Ibrahim Zeid, published by McGraw-Hill, 1991. (A portion thereof) | |
| 9 | | "Applied Numerical Analysis", fifth Edition, by Curtis F. Gerald and Patrick O., Wheatley, published by Addison-Wesley Publishing Company, Don Mills, Ontario, 1994. (A portion thereof) | |
| (5) | | "Curve Sawing", by John Hards; an article presented in the Canada/BC Forest Resource Development Agreement, Report 102 entitled: Advances in Sawmill Technology, dated October 1989. (A portion thereof) | |
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| Examiner | · · · · · · · · · · · · · · · · · · · | Date | |
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| Signature | | Considered | |

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

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Effective 10/01/2003. Patent fees are subject to annual revision.

Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT

| (\$) | 180 |
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|----------------------|-----------------|--|--|
| Patent | 5,884,682 | | |
| Filing Date | Mar. 21, 1997 | | |
| First Named Inventor | Joe. B. Kennedy | | |
| Examiner Name | W. Donald Bray | | |
| Art Unit | 3725 | | |
| Attorney Docket No. | 24096 | | |

| METHOD OF PAYMENT (check all that apply) | FEE CALCULATION (continued) | | | |
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| Check Credit card Money Other None | 3. ADDITIONAL FEES | | | |
| Order Order | arge Entity Small Enti | ty | | |
| Denosit | Fee Fee Fee | Fee Description | | |
| Account 300370 | Code (\$) Code (\$) 1051 130 2051 65 | Fee Paid | | |
| Number Deposit | | | | |
| Account Name Mario Theriault | 1052 50 2052 25 | 5 Surcharge - late provisional filing fee or cover sheet | | |
| The Director is authorized to: (check all that apply) | 1053 130 1053 130 | Non-English specification | | |
| Charge fee(s) indicated below Credit any overpayments | 1812 2,520 1812 2,520 | For filing a request for ex parte reexamination | | |
| Charge any additional fee(s) or any underpayment of fee(s) | 1804 920* 1804 920 | 0° Requesting publication of SIR prior to Examiner action | | |
| Charge fee(s) indicated below, except for the filing fee | 1805 1,840* 1805 1,840 | | | |
| to the above-identified deposit account. | 1,040 | Examiner action | | |
| FEE CALCULATION | 1251 110 2251 55 | Extension for reply within first month | | |
| 1. BASIC FILING FEE | 1252 420 2252 21 | Extension for reply within second month | | |
| Large Entity Small Entity | 1253 950 2253 47 | 5 Extension for reply within third month | | |
| Fee Fee Fee Fee Obscription Code (\$) Code (\$) Fee Paid | 1254 1,480 2254 741 | Extension for reply within fourth month | | |
| 1001 770 2001 385 Utility filing fee | 1255 2,010 2255 1,00 | 5 Extension for reply within fifth month | | |
| 1002 340 2002 170 Design filing fee | 1401 330 2401 16 | S5 Notice of Appeal | | |
| 1003 530 2003 265 Plant filing fee | 1402 330 2402 16 | 55 Filing a brief in support of an appeal | | |
| 1004 770 2004 385 Reissue filing fee | 1403 290 2403 14 | 5 Request for oral hearing | | |
| 1005 160 2005 80 Provisional filing fee | 1451 1,510 1451 1,5 1 | Petition to institute a public use proceeding | | |
| SUBTOTAL (1) (\$) | 1452 110 2452 5 | 55 Petition to revive - unavoidable | | |
| | 453 1,330 2453 66 | 55 Petition to revive - unintentional | | |
| 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE | 501 1,330 2501 66 | 55 Utility issue fee (or reissue) | | |
| Extra Claims below Fee Paid | 502 480 2502 24 | O Design issue fee | | |
| Independent | 503 640 2503 32 | 20 Plant issue fee | | |
| Claims - 3** = X = X Multiple Dependent | 460 130 1460 13 | 30 Petitions to the Commissioner | | |
| | 807 50 1807 5 | 50 Processing fee under 37 CFR 1.17(q) | | |
| Large Entity Small Entity Fee Fee Fee Fee Fee Description | 806 180 1806 18 | 30 Submission of Information Disclosure Stmt 180.00 | | |
| Code (\$) Code (\$) | 8021 40 8021 4 | Recording each patent assignment per property (times number of properties) | | |
| 1202 18 2202 9 Claims in excess of 20 1201 86 2201 43 Independent claims in excess of 3 | 809 770 2809 38 | 35 Filing a submission after final rejection | | |
| 1201 86 2201 43 Independent claims in excess of 3 1203 290 2203 145 Multiple dependent claim, if not paid | 810 770 2810 38 | (37 CFR 1.129(a)) | | |
| 1204 86 2204 43 ** Reissue independent claims | 2010 30 | 35 For each additional invention to be examined (37 CFR 1.129(b)) | | |
| over original patent | 1801 770 2801 38 | 35 Request for Continued Examination (RCE) | | |
| 1205 18 2205 9 ** Reissue claims in excess of 20 and over original patent | 1802 900 1802 90 | 00 Request for expedited examination of a design application | | |
| SUBTOTAL (2) (\$) | Other fee (specify) | | | |
| **or number previously paid, if greater; For Reissues, see above | Reduced by Basic Filing | Fee Paid SUBTOTAL (3) (\$) 180.00 | | |

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 Name (Print/Type)
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